IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

NCS MULTISTAGE INC.,	§	
	§	
Plaintiff,	§	CIVIL ACTION NO. 6:20-cv-00277 ADA
	§	
vs.	§	
	§	
NINE ENERGY SERVICE, INC.,	§	
	§	
Defendant.	§	

NCS'S RESPONSE TO NINE'S OPENING CLAIM CONSTRUCTION BRIEF

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Nine asks this Court to invalidate all 57 claims of the asserted ’445 Patent based on indefiniteness, even though the claims are clear, a POSA understands them, and the Examiner understood them during prosecution. Even Nine’s expert Dr. Meehan admitted in his deposition he understands numerous claim terms that Nine alleges are indefinite. Moreover, before claim construction started in this Court Nine filed an IPR petition where it demonstrated that it understood the terms and interpreted and applied the claims in ways that contradict the alternative constructions it is proposing here. Nine should be barred from taking positions in this Court that contradict its positions before the PTAB. Nine’s arguments twist the meanings of terms and focus on hyper technical nuances that a POSA would not interpose. NCS requests the Court reject Nine’s indefiniteness arguments and its contrived proposed constructions.

A. “internal diameter” (Claims 1, 22, 28, and 50)

Nine argues this term should be construed because it is included in a larger term (Term F below), which is purportedly indefinite. Dkt. 42, pp. 5-6. That makes no sense. Either a term does not need to be construed because it has plain and ordinary meaning to a POSA in view of the intrinsic record, or it needs to be construed because there is a dispute about its scope. *O2 Micron Int’l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008).

As explained in NCS’s opening Markman brief, in the oil and gas industry and in the patent specification and claims, “internal diameter” has an ordinary meaning that depends on how the term is used. Dkt. 41, pp. 4-5. For example, it can refer to a measurement of a cross-sectional line segment from an inner wall of a pipe to the opposite wall. *Id*. The meaning we learned in geometry class. Alternatively, in the oil and gas industry it also can refer to the inner surface of the pipe, i.e. the fluid passageway. *Id*. This latter meaning is found in all 57 claims in the phrase “an internal diameter **that defines a fluid passageway**.” *See e.g.*, Dkt. 41-2, Claims 1, 22, 28, 50. When cross-examined, Nine’s expert Dr. Meehan admitted that a measured diameter

by itself cannot define a fluid passageway, proving that "internal diameter of the casing string" as used in the claims does not necessarily refer to a measured diameter, it can refer to the inner surface of the casing string. Ex. B, 37:19-39:4. In fact, Nine used this second understanding of the term numerous times in its IPR petition. *See e.g.*, Ex. A, pp. 1, 6-7, 9, 16, 19, 24, 30, 31, 49, 50-51, 57, 62. Because this term has an understood meaning in the industry, it requires no construction. In any case, because the ordinary meaning of this term depends on how it is used, it does not make sense to construe it in isolation.

Nine's proposed construction is wrong on many fronts. First, it limits "internal diameter" to a measured diameter of a casing string, excluding its other ordinary meaning in the patent, the one recognized by its own expert and used by Nine in its IPR: the inner surface of the casing string, i.e. the fluid passageway. It is also wrong because it adds superfluous and limiting terms, like "fluid channel" and "casing string." The term "internal diameter" is not so limited, either by its plain meaning or the specification. Standing alone, it could include the diameter of the inside of a toilet paper roll. In the context of the patent, it could include the inside diameter of a rupture disc, which is clearly not a fluid channel or casing string. Dkt. 41-2, Fig. 2, 8:4-15. In every instance where a claim recites an "internal diameter," it refers to an object like the casing string: e.g., "the casing string having an internal diameter that defines a fluid passageway." *Id.*, Claim 28. As such, a construction of "internal diameter" does not need qualifying terms like "fluid channel" or "casing string."

B. "tubular member" (Claims 1, 22, 28, and 50)

Without any supporting argument or citations, Nine concludes this term does not have a plain and ordinary meaning. Dkt. 42, p. 7. But the question is whether the term has a plain and ordinary meaning to a POSA in view of the intrinsic evidence. *O2 Micron*, 521 F.3d at 1360. It does. As explained in NCS's brief, it simply refers to "one or more tubulars." Dkt. 41, p. 5.

Nine then argues this term must be limited to its supposed "implicit definition" in the specification, which is an upper tubular member coupled to a lower tubular member. Dkt. 42, p. 7. That is wrong for numerous reasons.

First, Nine's position directly contradicts the position it took in its IPR petition. There it argued that "tubular member" was met by a single tubular disclosed in the Entchev reference (element 340) with upper and lower ends, as opposed to coupled tubulars. Ex. A, p. 52.

Second, there is no part of the patent specification that uses the term "tubular member" to describe the combination of an upper tubular member and a lower tubular member. Rather, in connection with an embodiment, the specification only refers to a "lower tubular member" and an "upper tubular member" as separate components. *See e.g.*, Dkt. 41-2, Fig. 2, 2:49-58.

Third, under Federal Circuit law, the "[v]aried use of a disputed term in the written description demonstrates the breadth of the term rather than providing a limited definition." *Bell Atl. Network Serv., Inc. v. Covad Commcn's Group, Inc.*, 262 F.3d 1258, 1270 (Fed. Cir. 2001). The specification states that the rupture disc can be installed within "**one** or more tubulars, the tubulars being connectable to other tubulars in the casing string." Dkt. 41-2, 6:66-7:3, 7:17-21. It would be improper to limit this term in a way that excludes an express embodiment, *e.g.*, a rupture disc within "one tubular." *Oatey v. IPS*, 514 F.3d 1271, 1276-77 (Fed. Cir. 2008) ("We normally do not interpret claims in a way that excludes embodiments disclosed in the specification…at least [sic] where claims can reasonably [sic] be interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on the contrary.")

Fourth, Nine's construction is inconsistent with Federal Circuit law. NCS agrees with Nine's expert that the term "tubular" has an ordinary meaning to a POSA. *See* Dkt. 42-1, ¶69. It

is simply a tubular-shaped object that is used in downhole operations. For example, it could be a drill pipe, casing string, or something that is threaded into the casing string, like the tubular(s) of a rupture disc assembly. Ex. C, 69:14-70:8. What the parties dispute is whether "member" changes that ordinary meaning. Nine says it does. But the Federal Circuit has held that the ordinary meaning of "member" is simply a "structural unit" or a "distinct part of a whole." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002). There is a "heavy presumption" that "member" carries this ordinary meaning unless Nine can show the specification limits the term "member" to "a certain number of components or certain shape." *Id*. As explained above, Nine cannot make that showing. In fact, the term "member" is not used in the specification solely to describe the tubular(s) that make up the rupture disc assembly; it is used more generally to describe structures used in a downhole environment, such as any structure attached to the casing string (Dkt. 41-2, 7:59-62) or a fluid tight seal (Dkt. 41-2, 9:22-24). In other words, "member" does not change the ordinary meaning of "tubular."

Finally, there is nothing in the plain words of "tubular member" that indicates it is limited to two coupled tubulars. If the claims were intended to be limited to two coupled tubular members, they would have been written that way.

C. "sealing engagement" (Claims 1, 22, 28, 50, and 55)

Nine argues its proposed construction is merely taking the specification's definition of "sealing" and combining it with the plain an ordinary meaning of "engagement," which is to "attach or secure." Dkt. 42, p. 8. This argument has numerous problems.

First, Nine's construction is improper in that it adds into its proposed construction the disputed term "attached." As shown in Term F below, the parties hotly contest the meaning of the word "attached." For that reason alone, Nine's construction should be rejected.

Second, Nine says "engagement" means "attach or secure," relying on one out of

fourteen definitions in the Oxford Dictionary. Dkt. 42, p. 8, Dkt. 42-6, p. 408. But the plain and ordinary meaning of the term "engagement" doesn't just come from an external dictionary definition, it comes from a POSAs understanding in view of the intrinsic evidence. *O2 Micron*, 521 F.3d at 1360. The patent uses the term engagement generically to refer to a **relationship** between two structures; it does not refer to **how** that relationship is accomplished. For example, the specification states the rupture disc "can be ruptured by engagement with an impact surface…" Dkt. 41-2, 2:1-9. How that engagement is accomplished is that the disc is driven in the downhole direction by hydraulic pressure, "being impelled against the impact surface." *Id*. As another example, the specification states "the disc may be engaged within the casing string by a securing mechanism." *Id.*, 2:10-11. The term "engaged" identifies a relationship between the disc and the casing string, and how that is accomplished is "by a securing mechanism." *Id*. Directly pertinent to this term, the specification also states the "rupture disc is held in sealing engagement between the upper tubular member and the lower tubular member by a securing mechanism." *Id.*, 2:51-54. Here, the term "engaged" identifies a sealing interaction between the disc and the tubulars, and it is held in that engagement by a securing mechanism. *Id*. In other words, in the patent, the term "engagement" is simply synonymous with a relationship. Nine obviously agrees, because in its IPR petition it treated "sealing engagement" as a relationship, stating "[t]he rupture disc can be in sealing engagement via a seat, an O-ring and/or a crush seal with a region of the tubular member within the upper and lower ends." Ex. A, p. 23. Nine's construction is wrong and inconsistent with its IPR arguments in that it goes beyond the plain meaning of "engagement" and tries to limit the term to **how** the relationship is made—i.e., by being "attached or secured."

Finally, Nine's construction is unnecessarily redundant. Nine's expert testified that the

terms "secured" and "attached" are synonymous. Ex. B, 46:13-47:3, 48:7-18, 49:1-6.

D. "the rupture disc is…configured to rupture when exposed to a rupturing force greater than the rupture burst pressure" (Claims 1, 22, 29 and 56)

Nine alleges this term is indefinite because it requires a POSA "compare a rupturing force and a rupturing pressure, which are fundamentally not comparable." Dkt. 42, p. 9. Nine's indefiniteness argument is not only wrong, it is undermined by its alternative proposed construction, where it admits the specification defines hydraulic pressure as a type of rupturing force. Dkt. 42, p. 10 (citing Dkt. 42-2, 2:7-8).

First, pressures and forces are certainly comparable. For example, when a hydraulic pressure is applied over an area, that pressure can be easily calculated as a force acting on the area, like the surface of a rupture disc. Nine's expert Dr. Meehan admitted that in his deposition. Ex. B, 55:7-24, 58:8-18, 73:14-25.

Second, indefiniteness does not hinge on technical arguments divorced from the specification; the question is whether the claims, "read in light of the patent's specification and prosecution history" inform the POSA with reasonable certainty about the scope of the invention. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 898-99 (2014). A POSA clearly understands the scope of a "rupturing force" in view of the intrinsic record. As Nine admitted, the specification defines rupturing forces as both hydraulic pressures and impact forces. Dkt. 42, p. 10 (citing Dkt. 42-2, 2:7-8); *see also* Dkt. 41-2, 3:1-3, 4:60-64, 6:19-21, 11:8-12:6; Dkt. 41-1, ¶ 48-49. The rupture burst pressure is defined in the specification as the pressure at which the disc would rupture due to hydraulic pressure **alone**. Dkt. 41-2, 3:1-3; 9:65-67. Thus, because this claim term refers to a rupturing force relative to the disc's rupture burst pressure, a POSA understands from the specification that it is necessarily describing an amount of hydraulic pressure that alone can rupture the disc. NCS's proposed construction incorporates this concept

by construing the term as "the rupture disc can rupture if exposed to **hydraulic pressure** that is higher than its rupture burst pressure." *See* Dkt. 41, pp. 9-10.

In the alternative, Nine proposes the Court construe "rupturing force" as a "rupturing pressure." Dkt. 42, pp. 9-10. But this construction does not help the jury understand that the rupturing force being described in this term is a hydraulic pressure.

Nine also claims that its alternative construction contradicts the specification. Dkt. 42, p. 10. For that reason alone its alternative construction should be rejected. Certainly, there is no contradiction when "rupturing force" is construed as a "hydraulic pressure." Again, Nine's expert admitted one could readily convert a hydraulic pressure to a force. Ex. B, 55:7-24, 58:8-18, 73:14-25. All that this claim term says is that the disc is designed to rupture at a certain pressure above its rupture burst pressure. For example, the disc can be made to have a rupture burst pressure at 10,000 psi, which means it will only burst at a pressure **greater** than 10,000 psi. *See* Dkt. 41-2, 6:19-23; Dkt. 41-1, ¶¶28-29, 48. The specification quote referenced by Nine—"[t]he hydraulic pressure required to cause disruption of the securing mechanism is ***less than*** the hydraulic pressure would normally be required to break the rupture disc"—refers to the securing mechanism, not the disc. It just says that there is a pressure that disrupts the securing mechanism that holds the disc (e.g., 3,000 psi) so the disc disengages, and that pressure is "**less than**" the disc's rupture burst pressure (e.g., 3,000 psi < 10,000 psi). *See* Dkt. 41-2, 2:19-21, 10:56-57. The disengagement is caused by a force acting on the disc due to hydraulic pressure.

E. "rupturing force" (Claims 1, 22, 27, 29, 56, and 57)

Nine argues this term is indefinite for the same reasons it argues Term D above is indefinite. Dkt. 42, p. 10. NCS's above opposition arguments for Term D are incorporated here.

Nine also argues the Court should reject NCS's construction of "rupturing force" because it contradicts NCS's construction of Term D. Dkt. 42, p. 11. It does not. NCS proposes the term

"rupturing force" be construed as a hydraulic pressure or an impact force, because these are the two types of rupturing forces defined in the specification. Dkt. 41-2, 3:1-3, 4:60-64, 6:19-21, 11:8-12:6; Dkt. 41-1, ¶ 48-49. As explained above, in Term D we know the type of "rupturing force" described is a hydraulic pressure, because that force is compared to the disc's "rupture burst pressure," which is "the pressure at which hydraulic pressure **alone** causes rupture of the disc." Dkt. 41-2, 3:1-3; 9:65-67. A POSA would know to compare the rupture burst pressure to a hydraulic pressure, as opposed to an impact force. Dkt. 41-1, ¶¶48-49. In contrast in dependent claim 57, a "rupturing force" is applied to the disc to rupture it. As explained in the specification, this "rupturing force" is not just the hydraulic pressure that disengages the disc so that it moves downhole, it is a combination of the disengaging pressure and an impact force when the disc is impelled against a surface. Dkt. 41-2, 2:3-30, 10:35-47, 11:27-12:22; Dkt. 41-1, ¶¶28-29, 49.

F. "the region of the tubular member where the rupture disc is attached has a larger internal diameter than the internal diameter of the casing string and is parallel to the internal diameter of the casing string." (Claims 1, 22, 28, and 50) [1]

Nine alleges this term is indefinite because it requires that the internal diameter of the casing string and region where the rupture disc is attached be "parallel," and those two features have no inherent direction. Dkt. 42, p. 11. Nine is wrong and over-complicating a very simple and clear limitation. All this limitation means is that when the rupture disc assembly is installed between casing string pipes, the wall that the disc is directly secured and sealed to is a cylinder that is wider than and parallel to the inner surface of the casing string, like a large cylinder pipe nested between two smaller cylinder pipes. Nine understands this, because, as explained below,

[1] NCS revised its proposed construction to "in the ~~first portion~~ region of the tubular member, the rupture disc is directly secured to and in sealing engagement with a cylindrical surface that is wider than and parallel to the inner surface of the casing string." The change is due to a clerical error when the parties exchanged constructions. Nine does not object to this change.

it applied this meaning in its IPR. Nine should be barred from taking contradicting positions.

1. "the region of the tubular member where the rupture disc is attached"[2]

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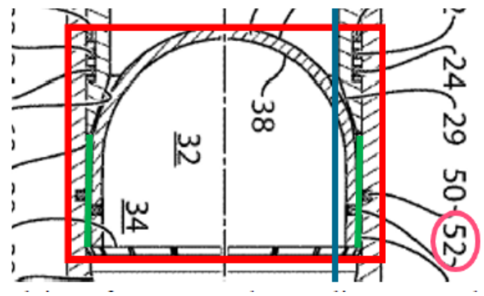
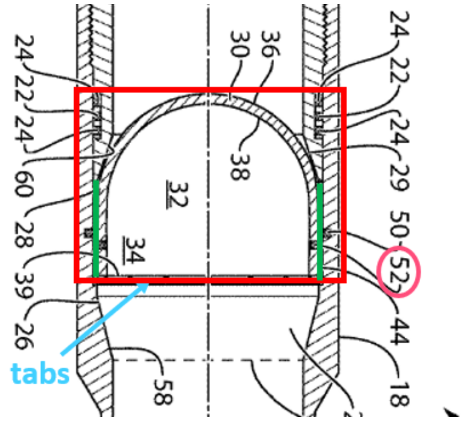


As an initial matter, Nine wrongly coins this portion of the disputed term the "Attachment Region." Dkt. 42, p. 12. NCS objects to this shorthand form because it is misleading. The antecedent basis for this term is the rupture disc is "in sealing engagement with a region of the tubular member." *See e.g.*, Dkt. 41-2, Claims 1, 22, 28, 50. This describes the area in the tubular member where the disc is initially held and seals the assembly. For example, in the embodiment shown above, this "region" is identified by the **red** box. Dkt. 41-2, Fig. 2. The phrase "the region of the tubular member where the rupture disc is attached" is describing a surface (**green**) included in that region where the rupture disc is attached, or, an Attachment Surface included in the Region as opposed to Nine's "Attachment Region." In fact, even Nine's expert Dr. Meehan admitted in his deposition the term "region" plainly refers to a "vicinity," as opposed to a point of attachment included in the vicinity. Ex. B, 80:11-81:2.

Next, Nine says the term "attached" has a plain and ordinary meaning of "fastened, affixed, joined, or connected." Dkt. 42, p. 12. Nine is not proposing a plain and ordinary meaning construction, it is offering a construction divorced from the intrinsic record and based solely on a definition from a general usage dictionary, "which cannot overcome art-specific evidence of the meaning of a claim term." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1322 (Fed. Cir. 2005). For that reason alone the Court should reject Nine's construction.

[2] Nine breaks up this term into three pieces. NCS contends the entire term is needed to understand its context and its meaning. Nevertheless, NCS addresses Nine's arguments for each piece.

Furthermore, Nine's proposed construction is wrong because in this term where the disc is "attached" is not where it is "fastened, affixed, joined, or connected." It is where the disc is secured and sealed. Dkt. 41-2, Fig. 2. Referring to annotated Figure 2 to the right, the disc is held in the region of the tubular member (**red** box) in three ways. First, the disc is seated on the tabs of a securing mechanism 44 (**blue**). *Id.*, Fig. 2, 9:67; Dkt. 41-1, ¶23. This prevents the disc from moving axially in the downhole direction (i.e. down in the image). Dkt. 41-1, ¶¶23-24. There is nothing coupling the disc to the tabs, the disc merely rests on the tabs. *Id*. Second, a tapered surface 29 above the disc can prevent the dome from moving axially in the uphole direction (i.e. up in the image). Dkt. 41-2, Fig. 2, 9:25-26; Ex. C, 133:22-134:23. A POSA understands the disc is not "attached" to this surface because it does not even contact the tapered surface. *Id*. Finally, and relevant to this term, a cylindrical surface (e.g., **green** surface) directly secures the disc from moving laterally (i.e. left to right in the image) and is also sealed to the disc via seal 52 (in **pink**). Dkt. 41-2, Figs. 2-3, 9:43-47, 67; Dkt. 41-1, ¶23. This is clearly the attachment surface described in this term, as it is the only surface in the region that secures the disc and has a sealing engagement with the disc.



NCS's proposed construction makes the identity of this surface clearer for the jury by proposing "the region of the tubular member where the rupture disc is attached" be construed as "in the region of the tubular member [i.e. the **red** box], the rupture disc is directly secured to and in sealing engagement with a cylindrical surface [e.g., the **green** surface]." Nine must agree with NCS's construction because in its IPR Nine argued for this term that the prior art teaches "the region of the tubular member where the rupture disc (*e.g.*, frangible plug) is **attached** is the

region where the seat **seals** the frangible plug to the tubular member ….” Ex. A, p. 56.

2. "the region of the tubular member where the rupture disc is attached has a larger internal diameter than the internal diameter of the casing string"

Nine alleges the attachment surface is “circular in order to have a diameter,” and thus proposed this term be construed as “the region of the tubular member where the rupture disc is fastened, affixed, joined or connected is circular and has a larger internal diameter than the internal diameter of the casing string.” Dkt. 42, p. 12. Nine’s construction of “attached” as “fastened, affixed, joined or connected” is wrong. *Supra* §F.1. Further, the term “circular” is not helpful to describe the attachment surface, because being “circular” alone does not define a surface. The attachment surface is a 3D cylinder, composed of an infinite number of circles.

3. "the region of the tubular member where the rupture disc is attached…is parallel to the internal diameter of the casing string"

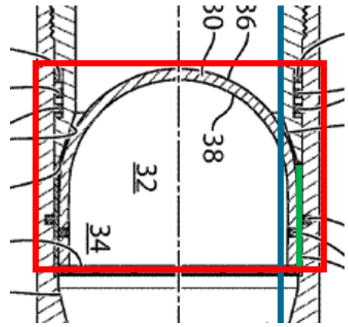
Nine’s indefiniteness argument comes down to this piece of the whole term. Nine alleges this term is indefinite because for two features to be parallel, “they must both have an inherent direction,” and the internal diameter of a casing string does not have an inherent direction. Dkt. 42, p. 13. Nine misapplies indefiniteness law, trying to interpret this claim with abstract geometry principles divorced from the intrinsic record. Again, the question before the Court is whether this term “read in light of the patent’s specification and prosecution history” inform “with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 898-99 (2014). It certainly does here. Moreover, the term informed Nine in the IPR where it used NCS’s proposed construction to apply the prior art. For some reason it does not inform Nine in this forum.

Nine wants to limit the term “internal diameter of the casing string” in this phrase to a measured diameter at a location in the casing string. But the “internal diameter of the casing string” or the “ID of the casing string” or the “casing string ID” are terms of art in the oil and gas

industry with dual meanings. Dkt. 41-1, ¶¶41-43. They can be used to generally describe the inner cylindrical surface of a casing string, or the string's fluid passageway, or they can be used to refer to the measured diameter at a location of the casing string. *Id*. For example, the claims all define the internal diameter of the casing string as a "fluid passageway." Dkt. 41-2, Claims 1, 22, 28, 50. That is clearly not a measured diameter, it is the inner surface of the casing string. Even Nine's expert admitted this when he was cross-examined on this phrase and testified that a measured diameter by itself cannot define a fluid passageway, proving that "internal diameter of the casing string" as used in the claims does not necessarily refer to a measured diameter, it can refer to the inner surface of the casing string. Ex. B, 37:19-39:4. Similarly, in the specification, the internal diameter of the casing string is used numerous times to describe the inner surface of the casing string in reference to restoring the casing ID so that it is fully open to fluid flow, which is not a reference to a measured diameter. Dkt. 41-2, Abstract, 2:40-45, 6:62-7:12; 10:47-53, 13:14-16; Dkt. 41-1, ¶¶20, 28. A POSA understand the term's meaning depends on the context in which is used. Dkt. 41-1, ¶¶41-43. Indeed, NCS's expert cited numerous references where the internal diameter of the casing string refers to the inner walls of the casing as opposed to a measured diameter. *Id*. at ¶42. Again, in its IPR Petition Nine agreed with that meaning. Nine used this term numerous times there to describe the casing string fluid passageway, as opposed to a measured diameter. Ex. A, pp. 1, 6-7, 9, 16, 19, 24, 30, 31, 49, 50-51, 57, 62.

The term "internal diameter of the casing string" cannot be construed out of context. In this term, the attachment surface is "parallel to the internal diameter of the casing string." Because of that context, a POSA understands that this term is comparing the orientation of the attachment surface to the orientation of the walls of the casing string, as opposed to a measured

diameter—i.e. they are cylindrical surfaces that are parallel to one another. Dkt. 41-1, ¶47. This parallel orientation is shown in the image below, where the orientation of the attachment surface is the **green** line and the orientation of the casing ID is the **blue** line. This term is certainly definite. Dkt. 41-2, Fig. 2.



Critically, this was the meaning Nine gave this term in its IPR filed before claim construction in this forum. In the IPR, Nine alleged prior art reference Entchev met this limitation because the seating surface of the disc is parallel to the inner surface of the casing string, "with both IDs being parallel ***vertical*** lines." Ex. A, pp. 56-57 (emphasis added). In other words, in the IPR Nine interpreted the claims consistent with NCS's proposed interpretation (casing ID = inner surface), while here it is taking a completely different position to argue indefiniteness (casing ID = measured diameter). This Court should not countenance Nine making an argument here, and the opposite argument to the PTAB.

Finally, Nine's argument that the casing string has no inherent direction is meritless and belied by its own expert. The claims recite that the upper and lower ends of the rupture assembly are configured for "connection in-line with the casing string." This "parallel" claim limitation is about how the attachment surface of the rupture assembly is oriented relative to the casing string threaded directly above and below the assembly, not about how the attachment surface would be oriented relative to casing string pipes positioned, for example, 1000s of feet away after they have been placed in a wellbore. *See* Dkt. 41-1, ¶47. Nine's expert agrees. In his deposition Dr. Meehan admitted that the casing string pipe attached to the upper and lower ends of the rupture disc assembly is "in-line" with the rupture disc assembly, and that the attachment surface (**green** line above) is indeed parallel to the inner surface of those pipes. *See* Ex. B, 93:21-94:17, 95:5-

96:19, 97:14-22, **103:15-104:15**; Ex. D, Annotated Deposition Exhibit. If Nine's own expert can make sense of the term, Nine cannot colorably argue this term is indefinite.

a. Nine's proposed construction is contrived and contradicts its IPR arguments.

Nine says in the alternative that a POSA could construe "internal diameter of the casing string" to mean "a plane defined by the set of measured internal diameters at a location in the casing string." Dkt. 42, p. 13. Looking at Figure 2, Nine then says the only potential "attachment region" that is parallel to that set diameters is the shear tab ring that the rupture disc is seated on which is "generally flat." Dkt. 42, pp. 14-16. Thus, it proposes that the attachment region be construed as "a flat surface… parallel to a plane defined by the set of internal diameters at a location in the casing string." *Id*. As explained in detail below, that construction is so contrived and requires so many mental gymnastics that even Nine ends up ultimately rejecting it in its brief. *See* Dkt. 42, p. 17. For that reason, the Court can reject Nine's alternative construction.

At bottom, Nine's proposed alternative construction is geared to obfuscate the meaning of this claim term to make it appear indefinite, with no legitimate consideration of its clear meaning in view of the intrinsic and extrinsic evidence. Nine's proposed construction also contradicts its interpretation of the term in its IPR petition.

First, as explained above, the attachment region is not the so-called "flat" surface that the disc rests on, it is the cylindrical side walls where the disc is secured and sealed. *See supra* § F.1. Nine's expert agreed when he testified the "region" refers to a "vicinity," not a surface. Ex. B, 80:11-81:2. Even Nine says that the disc is not attached to the "flat" surface. Dkt. 42, p. 17.

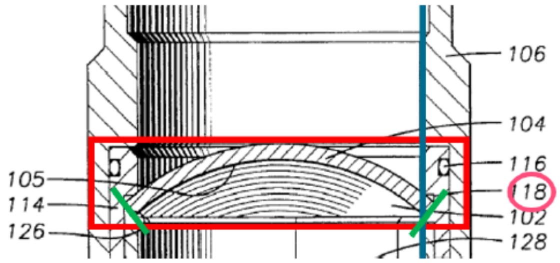
Second, Nine uses the term "flat surface" to describe the seating surface, but nowhere in the patent is there a description or concept of a "flat" surface. In fact, the word "flat" does not even appear in the patent. Nine's expert admitted he made up that term. Ex. B, 76:23-77:15. That alone shows "flat surface" is a completely fabricated limitation by Nine.

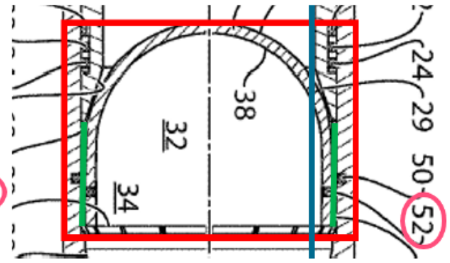
Third, if the Applicant had intended the attachment surface refer to the seating surface, it would have said so. And if the claims intended to compare the orientation of that seating surface to a measured diameter, the Applicant would not have described that surface as "parallel" to a measured diameter at any random location of the casing string. That is confusing and does not make sense, because there are an infinite number of cross-sectional diameters in the casing string surfaces and the rupture disc assembly surfaces. Every cross-section in the tubular member is parallel to the surface next to it. Rather, the Applicant would have simply described the seating surface as being **perpendicular** to the axis of the casing string.

Fourth, Nine's construction requires the rupture disc be "fastened, affixed, joined, or connected to" a "flat" surface. As explained in the specification, the disc is not "fastened, affixed, joined, or connected to" the bottom of the securing mechanism 44. The disc is "seated" on the bottom portion, and secured to and in sealing engagement with a cylindrical surface. Dkt. 41-2, Figs. 2-3, 9:43-47, 67; Dkt. 41-1, ¶23.

Fifth, Nine is wrong when it says its alternative construction is consistent with the Applicant's file history arguments over prior art reference Gano. Dkt. 42, p. 16. Referring to the below side-by-side images of Gano and Fig. 2 of the '445 Patent, Nine says the circumferential edge of Gano's rupture disc is seated on a sloped surface, and that the Applicant distinguished Gano by amending the claims to recite that the attachment surface is parallel. *Id.*, p. 16. Therefore, according to Nine, a POSA would understand that the claimed attachment surface refers to the surface on which the disc is seated. Nine is mischaracterizing and overcomplicating a very straightforward prosecution argument. The Applicant distinguished the claims by arguing that Gano's disc is "in sealing engagement with and attached to a region of the tubular member that is not parallel to the internal diameter of the casing string, **but is instead sloped**." Dkt. 41-3,

NCS-Airlock_00003844, NCS-Airlock_00003852. That can be easily seen in the below side-by-side drawings (compare below **green** and **blue** lines).





Because the Applicant focused on the sealing engagement, it was clearly distinguishing between Gano's sloped surface and the cylindrical surface in the '445 Patent where the disc is in sealing engagement, which is parallel to the casing ID. Nine's expert Dr. Meehan admitted in his deposition that Gano's "sloped" surface is not parallel to the walls of the casing string. Ex. B, 111:8-16. NCS's proposed construction is consistent with the intrinsic record, while Nine's is so inconsistent that even Nine rejects it.

Finally, Nine's construction contradicts its IPR, where it interpreted the term "parallel" as referring to the inner surfaces. Ex. A, pp. 56-57. For that reason alone the Court should reject it.

G. "specific gravity…of the well fluid" (Claims 24 and 52)

Nine argues this term is indefinite because a POSA understands that the specific gravity of the well fluid varies as a function of temperature and depth, and thus a POSA could not determine when the specific gravity of the fluid in the sealed chamber is less than the specific gravity of the well fluid. Dkt. 42, p. 17. The Court can dismiss this argument, particularly considering the admissions of Nine's expert.

As the specification explains, "[g]enerally, the buoyant chamber must be filled with fluid that has a lower specific gravity than the well fluid in the wellbore in which it is run, and generally, the choice of which gas or liquid to use, is dependent on factors such as the well

conditions and the amount of buoyancy desired." Dkt. 41-2, 5:37-41. Thus, a fluid can be selected that will have a lower specific gravity than the wellbore fluid at any temperature and depth. Nine's expert Dr. Meehan admitted that to float casing in a wellbore, the operator selects a fluid for the chamber that is lighter than the wellbore fluid. Ex. B, 24:4-12. He also admitted an operator can estimate and/or measure the specific gravity of the wellbore fluid even at distances as far as 8,000 feet, and use those estimates to determine if the fluid in the sealed chamber will be buoyant in the wellbore fluid. Ex. B, 21:2-9, 21:24-22:5, 23:1-24:12, 25:5-15, 27:6-28:10, 118:17-120:7, 121:20-122:2. As just one example, the sealed chamber could be filled with air, and a POSA understands that air has a lower specific gravity than wellbore fluid at any temperature and depth. Nine's expert also admitted this in his deposition. *Id*. at 25:5-15, 27:6-10. Again, Nine's expert can understand this term, so Nine cannot colorably argue it is indefinite.

H. "disengage the rupture disc from sealing engagement" (Claim 55)

Nine alleges this term does not need additional construction beyond Nine's construction of the term "sealing engagement", because the term "disengage" has a plain and ordinary meaning. Dkt. 42, p. 18. But Nine is in fact offering a claim construction of this term beyond plain and ordinary meaning, because it proposes the term be construed as "disengage the rupture disc **from being** attached or secured to create a fluid-tight seal." Under Nine's proposed construction, the disc becomes disengaged when it loses its seal, which can happen when the disc ruptures. Under NCS's proposed construction, the disc disengages when, before rupturing, it moves relative to the region of the tubular member where it is initially held (**red** box above). Thus, the scope of this term is in dispute and it must be construed. *O2 Micron*, 521 F.3d at 1360.

As explained in detail in NCS's opening brief, Nine's proposed claim construction of this term is wrong, is inconsistent with the claims and the specification, and excludes embodiments. Dkt. 41, pp. 19-20. For example, in Figure 2 of the patent, when the rupture disc disengages it

moves in the downhole direction and maintains its seal up until the point that it ruptures against an impact surface. *Id.*; *see also* Dkt. 41-2, Fig. 2, 10:6-7, 11:45-48; Dkt. 41-1, ¶¶27, 30. Nine's construction would exclude that embodiment, because under its construction the disc does not disengage until it loses its seal. To the extent Nine alleges the disengagement happens when the disc ruptures, that position would be at odds with the claims and specification. For example, dependent claim 55 recites applying a pressure to "disengage the rupture disc from sealing engagement." Dkt. 41-2, Claim 55. In other words, a pressure is applied to the disc to move it from the region of the tubular member where it is originally secured. Dependent claim 57, recites "further comprising applying a rupturing force to rupture the rupture disc." *Id.*, Claim 57. In other words, after the disc is disengaged to move from the region, a force then ruptures the disc. This is consistent with all the descriptions of "disengage" in the specification. *See id.*, Fig. 2, 9:32-42, 10:6-11, 11:27-58; Dkt. 41-1, ¶¶27, 30. In the claims and the specification, to disengage is to move, not to rupture.

Finally, Nine's claim construction contradicts its own expert Dr. Meehan. In his deposition he admitted that in this term the disc does not rupture when it disengages from sealing engagement: "When [the rupture disc] disengages, it accelerates downwards and then fails. The disengagement itself instantaneously doesn't cause a failure…" Ex. B, 70:23-71:5.

I. "rupture disc is configured to disengage from sealing engagement when exposed to a pressure greater than a hydraulic pressure in the casing string" (Claims 28 and 50)

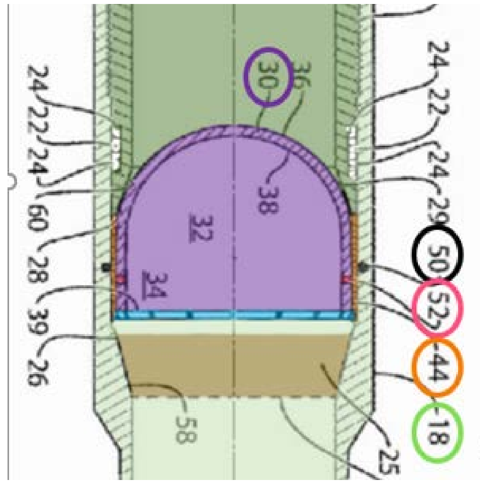
Nine argues this term is indefinite because a POSA cannot determine how to configure a rupture disc to "disengage from sealing engagement." Dkt. 42, p.18. That is wrong.

As explained above and in detail in NCS's opening brief, the term "disengage from sealing engagement" means that before rupturing, the rupture disc moves in the downhole direction relative to the region of the tubular member where it is originally positioned. *See* Dkt.

41, pp. 18-20; *supra* § H. This term simply recites that the rupture disc is "configured" to do that. The specification discloses in detail how to configure a rupture disc to move relative to its original position in the assembly by optimizing its material, structure, and dimensions.

First, in order for the disc to "disengage," the rupture disc must be made of a material and shape such that it will not prematurely rupture under the hydrostatic pressure of the drilling mud in the casing string, and it will not prematurely rupture when the pressure is increased to disengage the disc. *See* Dkt. 41-2, 4:60-66, 6:19-23, 10:64-11:26, 12:7-12:22. The disc can be made of materials like carbides, ceramics, metals, plastics, glass, porcelain, alloys, composite materials, etc. *Id*. at 10:64-67. In an embodiment, the disc can also be made hemispherical "because of their ability to withstand pressure from the convex side." *Id*. at 11:3-7. For example, in one embodiment, the disc can be designed with a material and shape to have a rupture burst pressure rating of 10,000 psi, so that it does not prematurely burst when subject to a hydrostatic pressure (e.g., 1,000 psi) or a disengaging pressure (e.g., 3,000 psi). *Id*. at 6:21-23. The specification even provides an example of a specific disc in the industry that can be used, one offered by company Magnum Oil Tools, which coincidentally was acquired by Nine. *Id*. at 11:19-24. Even Nine's expert testified the rupture disc is designed to have a certain rupture burst pressure based on its dimensions, geometry and materials. Ex. B, 56:2-57:18.

Second, for the disc to properly "disengage from sealing engagement" its dimensions must be such that the disc is able to freely move downhole at a disengaging pressure. For example, referring to annotated Figure 2 below, the disc 30 (**purple**) is designed to have a cylindrical base that is in sealing engagement with the cylindrical surface of a securing



mechanism (**orange**) via an o-ring seal 52 (**pink**), and it is dimensioned to maintain that seal as the rupture disc disengages. Dkt. 41-2, Fig. 2, 9:32-42, 10:6-11, 11:27-58; Dkt. 41-1, Rodgers Decl., ¶¶27, 30. The bottom of the disc is also dimensioned so that it can be seated on a securing mechanism like shear ring tabs (**lt. blue**). Dkt. 41-2, Fig.2, 9:67; Dkt. 41-1, ¶23. This requires the seating surface of the disc (bottom of the disc 30 in the figure) be made of a specific size, e.g., a disc with an outer diameter of 4.8m. *See e.g.*, Dkt. 41-2, 8:19-20. The disc is also dimensioned to transfer hydraulic pressure from its upper surface to the securing mechanism so that it can disengage at the disengaging pressure. For example, at the disengaging pressure, the disc is designed to transfer that pressure as a net force applied to the seating surface of the securing mechanism, like shear tabs, and that force overcomes the securing mechanism so that the disc moves downhole. Dkt. 41-2, 6:25-35, 9:67-10:6; Dkt. 41-1, ¶¶27, 35. This term is definite, as the specification clearly explains how to "configure" the disc to "disengage from sealing engagement."

Finally, Nine's expert admitted this term has meaning if the rupture disc is considered with other components, like a securing mechanism. Ex. B, 125:7-19. Again, if Nine's expert can interpret this term, Nine cannot plausibly argue this term is indefinite.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that all counsel of record were electronically served with a copy of the foregoing on November 20, 2020 via the Court's CM/ECF system.

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